UNITED STATES PATENT AND TRADEMARK OFFICE

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EXAMINER
GHULAMALI, QUTBUDDIN

ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	10/038,916	JIA ET AL.
	Examiner	Art Unit	
	Qutub Ghulamali	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>21 February 2006</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-41</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) <u>18-32,34,35 and 38</u> is/are allowed.

6)☒ Claim(s) <u>1-17, 33, 36, 37, 39-41</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Acknowledgement

1.   This Office Action is responsive to the Amendment filed 02/21/2006.

2.   Amendment of claim 17, by the applicant filed 02/21/2006, is hereby

acknowledged. The rejection under 35 U.S.C. 112, second paragraph is withdrawn in

light of the amendment. The amendment is considered acceptable.

Response to Arguments

3.   Applicant's remarks filed 02/21/2006, with reference to rejection of claims 1, 4, 7,

11, 14, 17 and 36 under 35 U.S.C. 103(a), and claims 39-41 under 35 U.S.C. 102(e),

has been fully considered but they are not persuasive. The claim rejections and

response to applicant's remarks/arguments follow.

4.   Applicant's remarks - The applicant asserts, pages 12-16, that Stein (reference

US 6,175,590) does not teach or suggest all limitations of the above claims.

5.   Examiner's response – With reference to applicant's assertion that Stein does

not disclose the correlator 234 not receive sequence of soft data elements, the

examiner respectfully would like to draw applicants attention to Stein col. 5, lines 1-5,

14-35, 64-67 wherein the exemplary embodiment of quite clearly discloses bit sequence

output from the demodulator 214 represent soft decision bits of the transmitted symbols

which are then presented to the correlator 234 along with the re-encoded bits from re-

encoder 236 to provide rate indication which in a similar form represents the quality of

the transmission to indicate no error exists in the received data, see also col. 9, lines

45-60 and col. 10, lines 6-42 that further highlights the quality metrics to indicate the

degree of confidence that the transmitter uses for appropriate rate selection (coding) to

source data. As per applicants assertion to the nature of the problem to be solved in

light of the teachings motivation to combine two or more references, there must be

some suggestion or motivation to combine the references. See In re Rouffet, 149 F. 3d

1350, 1355, 47 USPQ 2d 1453, 1456 (Fed. Cir. 1998). The suggestion to combine may

be found in explicit or implicit teachings within the reference themselves, from the

ordinary knowledge of those skilled in the art, or from the nature of the problem to be

solved. See id. At 1357, 47 USPQ 2d at 1458. Moreover, as long as some motivation

or suggestion to combine the references is provided by the prior art taken as a whole,

the law does not require that the references be combined for reasons contemplated by

the inventor. See In re Dillon, 919 F. 2d 688, 693, 16 USPQ 2d 1897, 1901 (Fed. Cir.

1990) (en banc), cert. Denied, 500 U.S. 904 (1991) and In re Beattie, 974 F. 2d 1309,

1312, 24 USPQ 2d 1040, 1042 (Fed. Cir. 1992).

Referring to applicant's argument, pages 14-15, "there is no teaching, suggestion or

motivation to combine ten Brink and Stein in the references themselves and that ten

Brink and Stein have different International and US classifications" the examiner would

respectfully state that such inferences cannot be held true because as long as there is

implicit or explicit disclosure of the subject matter in both ten Brink and Stein as

elaborated and exemplified above, the combination is both adequate and proper. Thus,

as stated by the examiner, the advantages described by Stein would have motivated

one of ordinary skill in the art to employ a correlator to determine correlation of soft data symbols (bits) with re-encoded bits from the re-encoder so that output error can be minimized as desired.

As per applicant's remarks regarding claims 39-41 rejection under 35 U.S.C. 102(e) to Thomas (US Pub. 2002/0051498) that Thomas does not disclose "a transmitter adapted to combine pilot and transmission parameter signal on a single overhead channel within an OFDM signal". The examiner respectfully would like to draw applicant's attention to Thomas figs. 12 and 13 wherein an OFDM transmitter and OFDM receiver respectively is disclosed. Thomas further discloses in a C-OFDM environment transmitter combine pilot (redundancy bits added to block signal constellation) and transmission parameter (input bits) as part of overhead (page 6, sections 0090, 0091). The examiner therefore firmly believes that in light of Thomas disclosure all elements of the claim as recited is adequately and properly addressed. The examiner notes that claim is further rejected because the claim reflects a single apparatus step with no further support components delineated.

As per claims 40 and 41, Thomas discloses that for precise decoding error correction is only enhanced by mitigating or puncturing some of the overhead bits which can then be used for channel estimation, compare the received symbols with the known pilot symbols (pilot is generally regarded as part of the overhead) to produce channel estimate (see fig. 14) (page 6, sections 0091 and 0092).

Claim Rejections - 35 USC § 112

6.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly
> claiming the subject matter which the applicant regards as his invention.

7.   Claims 33 and 39 are rejected under 35 U.S.C. 112, second paragraph, as being

indefinite for failing to particularly point out and distinctly claim the subject matter which

applicant regards as the invention.

Claim 39 provides for the use of a transmitter, but, since the claim does not set

forth any components involved in the transmitter, it is unclear as to what applicant is

intending to accomplish.

Claim 33 is improper because claim 1 is not a method claim.

Claim Rejections - 35 USC § 103

8.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

9.   Claims 1, 4, 7, 11, 14, 17 and 36 are rejected under 35 U.S.C. 103(a) as being

unpatentable over ten Brink (US patent 6,611,513) in view of Stein (USP 6,175,590).

Regarding claims 1, 4, 11, 14 and 36, Brink discloses a transmitter and a

receiver adapted to transmit and receive comprising:

a symbol de-mapper (fig. 3, element 24), receiving as input a sequence of received

symbols over the channel whose quality is to be measured, said symbol de-mapper

being adapted to perform symbol de-mapping on said sequence of received symbols to produce a sequence of soft data element decisions (see abstract, page 1, lines 63-67; page 2, lines 1-3; page 4, lines 60-67; page 5, lines 10-20);

a soft decoder, receiving as input the sequence of soft data element decisions produced by the symbol de-mapper, said soft decoder being adapted to decode the sequence of soft data element decisions to produce a decoded output sequence (page 5, lines 22-38).

Brink, however does not explicitly disclose, an encoder, receiving as input the decoded output sequence produced by the soft decoder, said encoder being adapted to re-encode the decoded output sequence with an identical code to a code used in encoding the source data element sequence to produce a re-encoded output sequence; and

a correlator receiving as input the sequence of soft data elements to produce a channel quality indicator output by determining a correlation between the sequence of soft data element decisions and the re-encoded output sequence.

Stein, in a similar field of endeavor discloses:

an encoder (236), receiving as input the decoded output (230) sequence produced by the soft decoder, said encoder being adapted to re-encode the decoded output sequence with an identical code to a code used in encoding the source data element sequence to produce a re-encoded output sequence (col. 5, lines 57-67; col. 6, lines 1-24); and

a correlator, receiving as input the sequence of soft data element decisions produced by the symbol de-mapper, and the re-encoded output sequence produced by the encoder,

said correlator being adapted to produce a channel quality indicator output by

determining a correlation between the sequence of soft data element decisions and the

re-encoded output sequence (col. 3, lines 1-16). It would have been obvious to a

person of ordinary skill in the art at the time the invention was made to use an encoder

to re-encode the decoded output sequence with an identical code to a code used in

encoding the source data element sequence to produce a re-encoded output sequence,

and a correlator to determining a correlation between the sequence of soft data element

decisions and the re-encoded output sequence as taught by Stein in the system of Brink

because the re-encoding can provide a higher rate of confidence with the received data

and a correlator for correlation between sequences can indicate that no error exists in

the received data frame.

Regarding claim 7, Brink discloses, a transmitter and a receiver adapted to

transmit and receive orthogonal channelized codes comprising:

receiving a sequence of OFDM symbols over the OFDM channel whose quality is to be

measured (abstract; col. 2, lines 65-67);

symbol de-mapping said sequence of received symbols to produce a sequence of soft

data element decision (see abstract, page 1, lines 63-67; page 2, lines 1-3; page 4,

lines 60-67; page 5, lines 10-20);

decoding said sequence of soft data element decisions to produce a decoded output

sequence pertaining to the source data element sequence (page 5, lines 22-38).

decoder, said encoder being adapted to re-encode the decoded output sequence with

an identical code to a code used in encoding the source data element sequence to

produce a re-encoded output sequence (col. 5, lines 57-67; col. 6, lines 1-24).

Brink, however does not explicitly disclose, re-encoding said decoded output sequence

to produce a re-encoded output sequence using a code identical to a code used in

encoding the source data element sequence; and

correlating said re-encoded output sequence, and said sequence of soft data elements

decisions to produce a channel quality indicator output.

Stein, in a similar field of endeavor discloses:

re-encoding said decoded output sequence to produce a re-encoded output sequence

using a code identical to a code used in encoding the source data element sequence

(col. 5, lines 57-67; col. 6, lines 1-24); and

correlating said re-encoded output sequence, and said sequence of soft data elements

decisions to produce a channel quality indicator output (col. 3, lines 1-16). It would

have been obvious to a person of ordinary skill in the art at the time the invention was

made to use an encoder to re-encode the decoded output sequence with an identical

code to a code used in encoding the source data element sequence to produce a re-

encoded output sequence, and a correlator to determining a correlation between the

sequence of soft data element decisions and the re-encoded output sequence as taught

by Stein in the system of Brink because the re-encoding can provide a higher rate of

confidence with the received data and a correlator for correlation between sequences

can indicate that no error exists in the received data frame.

As per claim 17, Brink discloses a method of determining a channel quality comprising: correlating a soft data element decision sequence with a second data element sequence; the second data element sequence being produced by decoding the soft data element decision sequence to produce a decoded sequence (col. 1, lines 54-67). Brink, however does not explicitly disclose re-encoding the decoded sequence. Stein in a similar field of endeavor discloses an encoder (236), being adapted to re-encode the decoded output sequence (col. 5, lines 57-67; col. 6, lines 1-24). It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use an encoder to re-encode the decoded output sequence as taught by Stein in the system of Brink because the re-encoding can provide a higher rate of confidence with the received data.

10.   Claims 2, 3, 5, 6, 12, 13, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Brink (USP 6,611,513) in view of Stein (USP 6,175,590) as applied to claim 1 above, and further in view of Jones et al (USP 6,215,813).

Regarding claims 2, 3, 5, 6, 12, 13, 15 and 16, Brink and Stein combined discloses every feature of the claimed invention. The combination however, is silent regarding symbol de-mapper is adapted to perform QPSK symbol de-mapping and Euclidean distance. Jones in a similar field of endeavor discloses a symbol de-mapper is adapted to perform QPSK symbol de-mapping and least squared Euclidean distance to the transmission symbol from the received symbol. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use QPSK symbol de-mapping and least squared Euclidean distance as taught by Jones in

the system of Brink and Stein because it can enhance performance in bandwidth and

system efficiency with relatively high processing gain.

11.   Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Brink

(USP 6,611,513) in view of Stein (USP 6,175,590), and further in view of Isaksson et al

(USP 6,865,232).

Regarding claim 33, Brink and Stein combined discloses every feature of the

claimed invention. The combination however, is silent regarding a computer readable

storage medium to store instructions for implementing the method. Isaksson in a similar

field of endeavor discloses (fig. 4) the system can be connected to a computer interface

to store various functional units and instruction for implementing the method. It would

therefore, be obvious to one of ordinary skill in the art at the time the invention was

made to use a computer readable medium to store the various instructions to the

method claimed as taught by Isaksson in the combined system of Brink and Stein

because it can provide useful information for recalling and carrying out the instructions

on a computational basis.

12.   Claims 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Brink (USP 6,611,513) in view of Stein (USP 6,175,590), and further in view of Thomas

(US Pub. 2002/0051498).

Regarding claim 8, Brink and Stein in combination discloses all limitations of the

claim except, disclose the symbol de-mapping is QPSK symbol de-mapping. Thomas in

a similar field of endeavor discloses the symbol de-mapping is QPSK symbol de-

mapping (page 6, section 0090). It would have been obvious to a person of ordinary

skill in the art at the time the invention was made to use QPSK de-mapping of symbols

as taught by Thomas in the combined art of Brink and Stein because it can minimize

error rate in the transmission of signals and optimize synchronization.

Regarding claim 9, Brink and Stein in combination discloses all limitations of the

claim except, does not explicitly show said sequence of received symbols comprises

Euclidean distance conditional LLR de-mapping. Thomas in a similar field of endeavor

discloses sequence of received symbols comprises Euclidean distance conditional LLR

de-mapping (page 4, section 0062). It would have been obvious to a person of ordinary

skill in the art at the time the invention was made to use Euclidean distance conditional

LLR de-mapping as taught by Thomas in the combined art of Brink and Stein because it

can minimize error rate in the transmission of signals and optimize synchronization.

With reference to claim 10, Brink and Stein in combination discloses all

limitations of the claim except, does not explicitly show decoding of sequence of soft

data element decisions to produce output sequence further comprises using a history of

the soft data element decisions, and using information about encoding of the sequence

of symbols transmitted over the channel. Thomas in a similar field of endeavor

discloses decoding of sequence of soft data element decisions to produce output

sequence further comprises using a history of the soft data element decisions, and

using information about encoding of the sequence of symbols transmitted over the

channel (page 6, section 0090). It would have been obvious to a person of ordinary skill

in the art at the time the invention was made to use Euclidean distance conditional LLR

de-mapping as taught by Thomas in the combined art of Brink and Stein because it can

minimize error rate in the transmission of signals and optimize transmission time.

Claim Rejections - 35 USC § 102

13.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

14.   Claims 39-41 are rejected under 35 U.S.C. 102(e) as being anticipated by

Thomas et al (US Pub. 2002/0051498).

Regarding claim 39, Thomas discloses a transmitter adapted to combine pilot

and transmission parameter on a single overhead channel within an OFDM signal (page

6, section 0091).

Regarding claim 40, Thomas discloses a transmitter wherein a set of

transmission parameter signaling symbols are transmitted on the overhead channel with

strong encoding such that at a receiver, they can be decoded accurately, re-encoded,

and the re-encoded symbols treated as known pilot symbols which can then be used for

channel estimation (page 6, section 0091).

Regarding claim 41, Thomas discloses a receiver adapted to produce decode a

received signal containing the encoded transmission parameter signaling symbols as

modified by a

channel, re-encode the decoded symbols to produce known pilot, compare the received

symbols with the known pilot symbols (pilot is generally regarded as part of the

overhead) to produce channel estimate (see fig. 14) (page 6, sections 0091 and 0092).

Allowable Subject Matter

15.   Claims 18-32, 34, 35 and 38 allowed.

16.   Claim 37 is objected to as being dependent upon a rejected base claim, but

would be allowable if rewritten in independent form including all of the limitations of the

base claim and any intervening claims.

Conclusion

17.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Qutub Ghulamali whose telephone number is (571) 272-

3014. The examiner can normally be reached on Monday-Friday, 7:00AM - 4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Mohammad Ghayour can be reached on (571) 272-3021. The fax phone

number for the organization where this application or proceeding is assigned is 571-

273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

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For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

QG.
May 16, 2006.

JEAN B. CORRIELUS
PRIMARY EXAMINER

5-22-06